

Claims

Sub 1

1. A method for acquiring images of variable sized objects in an image acquisition system, wherein the image acquisition system comprises an image sensing device and an image acquisition device, wherein the objects are moving relative to the image sensing device, wherein the method acquires images independent of spacing between the objects, the method comprising:
 - (a) the image acquisition device detecting presence of a first object;
 - (b) the image sensing device generating image data corresponding to the first object;
 - (c) the image acquisition device initiating storage of the image data corresponding to the first object in response to the image acquisition device detecting the presence of the first object;
 - (d) the image acquisition device detecting absence of the first object after detecting presence of the first object;
 - (e) the image acquisition device discontinuing storage of the image data corresponding to the first object in response to the image acquisition device detecting the absence of the first object.

20 2. The method of claim 1, further comprising the image acquisition device recording a size of the first object.

25 3. The method of claim 2, wherein the size of the first object is a number of scan lines corresponding to the first object stored by the image acquisition device.

4. The method of claim 1, further comprising the image acquisition device transferring the image data corresponding to the first object to a system memory image buffer in a memory of a computer system.

30 5. The method of claim 1, further comprising:

the image acquisition device initiating a counter of scan lines in response to the image acquisition device detecting the presence of the first object;

the image acquisition device terminating the counter of the scan lines in response to the image acquisition device detecting an absence of the first object;

5 the image acquisition device recording a final value of the counter after said terminating of the counter.

6. The method of claim 5, further comprising:

10 the image acquisition device rearming after the image acquisition device detects the absence of the first object, after the image acquisition device discontinues storage of the image data corresponding to the first object, and after the image acquisition device records the final value of the counter;

wherein the image acquisition device acquires more image data for a second object after said rearming and in response to detecting presence of the second object.

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7. The method of claim 6, wherein the image acquisition system further comprises an object detector configured to provide a signal indicating the presence and absence of objects including the first object to the image acquisition device, wherein said rearming comprises:

20 resetting the counter; and
initializing a pointer to an on-board image buffer on the image acquisition device.

25 8. The method of claim 7, further comprising the image acquisition device transferring the image data to a system memory image buffer in a memory of a computer system.

9. The method of claim 1, further comprising:

30 the image acquisition device rearming after the image acquisition device detects the absence of the first object, and after the image acquisition device discontinues storage of the image data corresponding to the first object;

wherein the image acquisition device acquires more image data for a second object after said rearming and in response to detecting presence of the second object.

10. The method of claim 9, wherein the image acquisition device includes an
5 object detector configured to provide a signal indicating the presence and absence of objects including the first object to the image acquisition device, wherein said rearming comprises initializing a pointer to an on-board image buffer on the image acquisition device.

10 11. The method of claim 1, wherein the image acquisition device is configured to acquire more image data for a second object after said discounting storage of the image data for the first object, and in response to detecting presence of the second object.

15 12. The method of claim 1, wherein (a), (b), (c), (d) and (e) are performed repeatedly for a plurality of objects in addition to the first object.

13. The method of claim 1, wherein the image sensing device is a line scan camera.

20 14. The method of claim 1, wherein said image acquisition device detecting presence of the first object comprises:

an object detector detecting the presence of the first object; and

the object detector providing a detection signal to the image acquisition device in response to the object detector detecting the presence of the first object;

25 wherein said image acquisition device detecting absence of the first object after detecting presence of the first object comprises:

the object detector detecting absence of the first object; and

the object detector providing an absence signal to the image acquisition device in response to the object detector detecting absence of the first object.

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15. The method of claim 1, wherein (b) is performed in response to the image acquisition device detecting the presence of the first object.

5 16. A system for acquiring images of variable sized objects, the system comprising:

an image sensing device, wherein the objects are moving relative to the image sensing device, wherein the image sensing device generates image data for a first object;

10 an image acquisition device coupled to the image sensing device, wherein the image acquisition device is operable to:

detect a presence of the first object;

initiate storage of the image data corresponding to the first object in response to the image acquisition device detecting the presence of the first object;

detect an absence of the first object; and

15 discontinue storage of the image data corresponding to the first object in response to the image acquisition device detecting absence of the first object.

20 17. The system of claim 16, further comprising an object detector coupled to the image acquisition device, wherein the object detector is operable to detect the presence and absence of objects including the first object, and to provide an object detection signal which indicates presence and absence of said objects to the image acquisition device.

25 18. A system for acquiring images of variable sized objects, the system comprising:

an image sensing device, wherein the objects are moving relative to the image sensing device;

30 an object detector for detecting a presence and absence of the objects including a first object;

an image acquisition device coupled to the image sensing device and the object detector, wherein the image acquisition device comprises an on-board memory;

wherein the image sensing device generates image data corresponding to the first object, wherein the image acquisition device initiates storage of the image data corresponding to the first object into the on-board in response to the object detector detecting the presence of the first object, wherein the image acquisition device discontinues storage of the image data corresponding to the first object in response to the object detector detecting absence of the first object.

10 19. The system of claim 18, wherein the image acquisition device further comprises a first direct memory access controller for transferring the image data corresponding to the first object from the on-board memory to an image buffer in a memory of a computer system.

15 20. The system of claim 18, wherein the image acquisition device further comprises a counter for counting a number of scan lines corresponding to the first object, wherein the image acquisition device is configured (a) to start the counter in response to the object detector detecting the presence of the first object, and (b) to terminate the counter in response to the object detector detecting the absence of the first object;

20 wherein the image acquisition device records a final value of the counter after the counter terminates counting.

25 21.. The system of claim 20, wherein the image acquisition device is further configured to rearm for acquisition of a second object after the image acquisition device discontinues storage of the image data corresponding to the first object, and after the image acquisition device records the final value of the counter;

 wherein the image acquisition device acquires more image data for the second object after said rearming and in response to detecting presence of the second object.

22. The system of claim 21, wherein the image acquisition device is configured to rearm for acquisition of the second object by resetting the counter, and initializing a pointer to an on-board image buffer on the image acquisition device.

5 23. The system of claim 18, wherein the image acquisition device is configured to rearm for acquisition of a second object after the image acquisition device discontinues storage of the image data corresponding to the first object;

wherein the image acquisition device acquires more image data for the second object after said rearming and in response to detecting presence of the second object.

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24. The system of claim 18, wherein the image acquisition device is configured to store more image data for a second object after said discontinuing storage of the image data corresponding to the first object, and in response to the object detector detecting presence of the second object.

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25. The system of claim 18, wherein the image sensing device is a line scan camera.

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